

*Material examined*

Holotype: Male, 8.0 mm, taken from gorgonian host, *Isis hippurus* Linnaeus, in 18 m on west islet of Ashmore Reef, Northwest Australia (12°14.28'S., 122°59.14'E.); 24 July 1986; coll. H. K. Larson. Paratypes: One male (no. 1) and two females (nos. 2–3), collected with the holotype. Holotype and paratype no. 2 are mounted on slide glasses in a gum-chloral medium. Collection number: NTM Cr. 00447.

*Etymology* The specific name, *triangulum*, is derived from the triangular propod of gnathopod 1.

## ACKNOWLEDGMENTS

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## The *Drosophila immigrans* Species-group of the Subgenus *Drosophila* (Diptera: Drosophilidae) in Yunnan, China

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**ABSTRACT**—A total of 22 species of the *Drosophila immigrans* species-group are reported from Yunnan, China, with description of 4 new species, redescription of 2 known species and new records of 14 known species from China.

### INTRODUCTION

The *Drosophila immigrans* species-group consists of four subgroups: the *immigrans*, *nasuta*, *hypocausta* and *quadrilineata* subgroups [1-3]. This species-group comprises the greater part of the drosophilid fauna in the Oriental Region [4-6]. Up to the present, 6 species of this group, *D. immigrans* Sturtevant, 1921, *D. nixifrons* Tan, Hsu et Sheng, 1949, *D. hexastriata* Tan, Hsu et Sheng, 1949, *D. annulipes* Duda, 1924, *D. spuricurviceps* Zhang et Gan, 1986 and *D. ruberrimoides* Zhang et Gan, 1986, have been reported from China [7, 8]. Based upon collections from Yunnan, this paper adds 4 new and 14 known species to the faunal list of this group in China. The 14 species new to China are *D. formosana* Duda, 1926, *D. shwezeyana* Toda, 1986, *D. burmae* Toda, 1986, *D. ruberrima* Meijere, 1911, *D. pentafuscata* Gupta et Kumar, 1986, *D. metasetigerata* Gupta et Kumar, 1986, *D. albomicans* Duda, 1924, *D. sulfurigaster albostrigata* Wheeler, 1969, *D. kohkoa* Wheeler, 1969, *D. siamana* Ikeda et al., 1983, *D. notostriata* Okada, 1966, *D. flavitibiae* Toda, 1986, *D. obscurinervis* Toda, 1986 and *D. quadrilineata* Meijere, 1911. *D. immigrans* and *D. annulipes* were also collected from Yunnan. In total, 24 species of the *immigrans* group (11 spp. of

the *immigrans* subgroup, 4 spp. of the *nasuta* subgroup, 1 sp. of the *hypocausta* subgroup, and 8 spp. of the *quadrilineata* subgroup) have been recorded from southern China. This number is the largest on the world, followed by Burma (18 spp.), Taiwan (17 spp.), India (17 spp.), Borneo (15 spp.), Malaya (12 spp.) and Sumatra (11 spp.), suggesting that the southwestern part of China is an evolutionary center of this species-group, especially the *immigrans* and *quadrilineata* subgroup.

Two known species which were originally described in Chinese [8] are redescribed here in English, along with 4 new species. All holotypes and paratypes are deposited in the Kunming Institute of Zoology, Academia Sinica, China. The diagnoses of the subgenus, species-group and species-subgroups were previously given by Toda [3].

### *D. IMMIGRANS SPECIES-SUBGROUP*

*Drosophila (Drosophila) spuricurviceps* Zhang et Gan

(Figs. 1-4)

*Drosophila (Drosophila) spuricurviceps* Zhang et Gan, 1986 [8]: 359.

♂, ♀. Body ca. 4.0-4.5 mm wing ca. 4.0-4.5 mm in length.

Head: Eye purple red, with thin pile. Second joint of antenna yellow, with 2 stout setae; 3rd joint yellow. Arista with 4 dorsal, 1 ventral branches and moderate terminal fork. Palpus yellow, with 2 stout bristles and a few small hairs.

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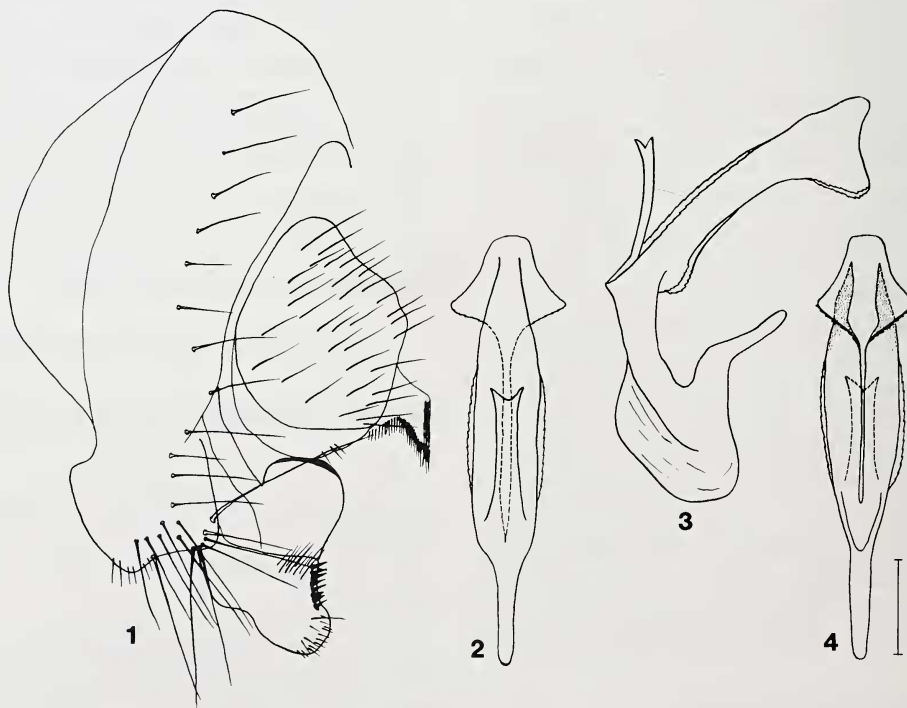
Ocellar triangle black, with a few hairs; ocellars long. Periorbit yellowish. Frons orange yellow. Clypeus dark brown. Frons *ca.* 1/2 as broad as head, with a few frontal hairs. Face brownish. Carina low and short, without sulcus. Cheek yellow, black at base of vibrissa, *ca.* 1/5 as broad as greatest diameter of eye. Posterior reclinate orbital nearer to proclinate than to inner vertical. Anterior reclinate orbital *ca.* 2/5 length of posterior reclinate; proclinate *ca.* 4/5 length of posterior reclinate. Vibrissa long, stout and black, 2nd oral *ca.* 1/5 length of vibrissa.

Thorax: Mesoscutum dark brown, with 6 obscure black longitudinal stripes; median 2 stripes between dorsocentrals, sometimes fused to each other at anterior part; 2 stripes running along line of dorsocentrals; outer 2 stripes from transverse suture. Scutellum brownish black, paler at anterior corner and tip. Thoracic pleura brown, with 3 obscure black longitudinal stripes; upper one narrow, short from lower part of episternum to base of wing; middle one broad, slightly fused anterior-

ly with upper one, running from upper part of propleurite to base of haltere; lower one broad, running through nearly entire length of sternoeπισternum. Sometimes thoracic pleura entirely dark brown. Humeral plate brownish; humerals 2, upper one longer. Acrostichal hairs in 6 rows. Anterior dorsocentral *ca.* 0.6–0.7 length of posterior; cross distance of dorsocentrals *ca.* 2.0 length distance. Anterior scutellars parallel, as long as posterior; posteriors convergent and crossed. Sternite-index *ca.* 0.5–0.6.

Legs yellow. Fore femur with row of *ca.* 10 spinules. Preapicals on all tibiae; apicals on fore and mid tibiae. ♂ fore tarsus neither modified nor ornamented. Mid and hind tarsi without row of minute cuneiform bristles on underside. Fore metatarsus as long as 2 succeeding tarsal joints together; mid and hind metatarsi slightly shorter than rest together. Apical 2 tarsi brown.

Wing hyaline. Veins brown; anterior cross vein slightly cloud; posterior cross vein cloud;  $R_{4+5}$  and M parallel.  $C_1$ -bristles 2, subequal.



FIGS. 1–4. *Drosophila (Drosophila) spuricurviceps* Zhang et Gan, 1986. 1:Periphallallic organs. 2: Aedeagus (dorsal view). 3: Ditto (lateral view). 4: Ditto (ventral view). Scale-line=0.1 mm.

Wing indices: C *ca.* 4.0–4.5, 4V *ca.* 1.6, 4C *ca.* 0.6, 5x *ca.* 1.3, Ac *ca.* 1.8, C3F *ca.* 1/3–1/4. Haltere milky white.

Abdomen: ♂ tergites black, except yellow 1st tergite. ♀ tergites yellow, each with uninterrupted caudal black band. Sternites pale yellow.

Periphallic organs (Fig. 1): Epandrium in upper part dark brown, with 8 bristles; in lower 1/3 pale yellow, with *ca.* 16–17 bristles; ventrally truncate. Surstylus with slightly concave row of *ca.* 8 primary teeth on middle margin; lower part convex, with small bristles; upper part strongly convex, bare; medio-inner surface with small bristles. Cercus setigerous except ventral margin, brown except anterolateral (black) and ventral (yellow) margins, caudo-ventrally with flap bearing V-shaped row of stout bristles on ventral margin.

Phallic organs (Figs. 2–4): Aedeagus round at tip, apicoventrally with 1 pair of marginally serrate flaps, dorsomedially and ventrobasally serrate on lateral margins. Dorsal process elongated and flattened flap, apically bifid. Apodeme broad in lateral view. Novasternum nearly quadrate; hypandrial plate triangular, with 1 pair of small submedian spines.

Ovipositor yellow, apically broad and round, with *ca.* 22 marginal but no discal teeth.

*Specimens examined.* China: 6♂, 1♀, Kunming, Yunnan Province, 21.II.1987 (M. J. Toda).

*Distribution.* China: Yunnan.

*Relationships.* This species is closely related to *D. curviceps* Okada et Kurokawa, 1957, but differs from the latter in the morphology of aedeagus, surstylus and carina. Zhang and Gan [8] regarded the presence of V-shaped row of stout bristles on caudoventral expansion of cercus as an important diagnostic character by which the present species is distinguished from *D. curviceps*, based on the ignorance of similar character in the original description of the latter species [9]. However, one of us (M. J. T.) confirmed the presence of the similar structure, i.e. caudoventral expansion with numerous stout bristles, in Japanese specimens of *D. curviceps*.

*Drosophila (Drosophila) ruberrimoides* Zhang et Gan  
(Figs. 5–8)

*Drosophila (Drosophila) ruberrimoides* Zhang et Gan, 1986 [8]: 360.

♂. Body *ca.* 4.0–4.5 mm, wing *ca.* 4.0–4.5 mm in length.

Head: Eye tannish red, with thick pile. Second joint of antenna dark brown, with 3 stout setae; 3rd joint yellow. Arista with 6 dorsal, 4 ventral long branches and moderate terminal fork. Palpus yellow, with 2 long stout bristles at tip and a few small hairs. Ocellar triangle black, with silvery-white shining on outside margin of ocelli in frontal view, with a few small hairs; ocellars long and divergent. Periorbit shining silvery-white in frontal view. Frons brownish yellow in frontal view but shining silvery-white in lateral view, anteriorly orange-yellow. Clypeus brown. Frons *ca.* 1/3 as broad as head, with a few frontal hairs. Face brown. Carina high, wider in lower part. Cheek yellow, *ca.* 1/7 as broad as greatest diameter of eye. Occiput medially black. Posterior reclinate orbital nearer to proclinate orbital than to inner vertical. Anterior reclinate orbital *ca.* 1/3 length of posterior reclinate; proclinate *ca.* 3/4 length of posterior reclinate. Vibrissa and 2nd oral stout, black and long; 2nd oral as long as vibrissa; other orals small.

Thorax: Mesoscutum yellow. Scutellum brownish yellow, quadrate. Thoracic pleura yellow. Humeral 2, subequal. Acrostichal hairs in 8 rows. Anterior dorsocentral *ca.* 2/5 length of posterior; cross distance of dorsocentrals *ca.* 3.0 length distance. Anterior scutellars divergent; posteriors convergent. Anterior scutellar as long as posterior. Sterno-index *ca.* 0.6; mid sternopleural nearly equal to anterior.

Legs yellow. Fore femur thick, with row of *ca.* 13–17 spinules. Preapicals on all tibiae, apicals on mid tibia. ♂ fore proximal 2 tarsal joints thin and short, each with thick hair tuft on inner side and 1 black, long bristle at distal end. Mid and hind tarsi each with row of minute cuneiform bristles on underside. Fore metatarsus shorter than 2 succeeding tarsal joints together; mid and hind metatarsi slightly shorter than rest together.